

ACCIDENT INVESTIGATION REPORT

VETTERS V. DAIMLER CHRYSLER

I. Introduction

I was requested by the law firm of Sico, White, and Braugh to conduct an independent investigation into an incident that resulted in serious personal injury and death to their client.

II. Background

The subject accident was investigated by the Corpus Christi Police Department. The investigator's narrative opinion states the following:

"It is believed that Unit #1 was parked and in the drive way when it slipped into reverse. The pedestrian attempted to get back into the vehicle and place it in park when she was struck by the vehicle. Responding officers advised that the vehicle was still in reverse the door was shut and on when they arrived. There was no indication of what part of the vehicle struck the pedestrian."

Based upon the depositions, physical evidence, photographs, and witness statements, Ms. Vettters started the vehicle, backed down the driveway near the mailbox, shifted the vehicle into "park", exited the vehicle to retrieve her mail, the vehicle backed up in powered reverse with a right steering wheel input. In the course of the vehicle backing up in reverse, Ms. Vettters was struck by the vehicle.

I inspected the subject vehicle at the Sico, White, and Braugh Warehouse in Corpus Christi, Texas on September 6, 2005. The vehicle did not have any damage to the body and was operational at the time of my inspection.

III. An index of my file materials available at the time of this report is presented in Exhibit 1.

IV. My qualifications and curriculum vitae are presented in Exhibit 2.

V. Preliminary Opinions and Conclusions

The following opinions and conclusions are based upon a reasonable degree of scientific and engineering certainty and the information available, my inspection of the subject vehicle, examination of exemplar vehicles/bucks, testing of exemplar components, research, analysis, experience, education, training, and review of discovery materials, including documents and depositions. They are subject to supplement and amendment pending any additional information that may be forthcoming through discovery, investigation, and vehicle tear down.

PLAINTIFF'S
EXHIBIT

EXHIBIT "C"

Discovery Ex. No. 48

Cause No. 05-03

Vettters vs.

DaimlerChrysler

VETTERS, S.
1527-003818

I also am relying on discovery materials for my supporting basis provided in other similar cases I have investigated. I have previously received discovery materials from Daimler Chrysler in other substantially similar park to reverse cases, some of which may be subject to protective orders and therefore cannot be specifically referenced.

- A. The subject 2002 Dodge Durango is unreasonably dangerous and defective due to defects associated with the automatic transmission gear selection system and the brake-shift interlock system. These defects include manufacturing defects, design defects, and/or marketing defects.
- B. The unreasonably dangerous and defective conditions of the subject vehicle are a proximate cause of the risk of serious injury and death to persons under the conditions of this readily foreseeable accident.
- C. The defective conditions existed on the subject vehicle at the time it left the control of Daimler Chrysler.
- D. There is no safety benefit in comparison to the risk of injury for a vehicle to have an inherent, latent defective condition in the automatic transmission gear selection system and/or brake-shift interlock system.
- E. The specific defects associated with the design of the subject vehicle's automatic transmission gear selection system and brake-shift interlock system are as follows:
 - 1. False park position between park and reverse detents;
 - 2. Relatively flat land on inner shift plate allowing placement of gear shift between park and reverse;
 - 3. Uncontrolled hydraulic bleed position between park and reverse detents;
 - 4. Lack of a positive detenting gear selection system, such as increased spring tension and elimination of the hydraulic bleed position;
 - 5. Lack of a proper FMEA;
 - 6. Defective ignition and steering lock mechanism which allows removal of the ignition key with gear selection in false park and steering-wheel rotation with ignition key removed (subject to joint vehicle tear down, this will prove to be a design or manufacturing defect or both);
 - 7. Defective brake-shift interlock system or total absence of brake-shift interlock system (subject to joint vehicle tear down, this will prove to be a design or manufacturing defect or both);

8. Lack of proper design validation procedures;
 9. Representing the presence of brake shift interlock safety feature when it is either absent or nonfunctional.
- F. Daimler Chrysler was aware of the hazard of sudden, unexpected shifting into powered reverse prior to the production of the subject vehicle.
- G. Daimler Chrysler was aware of the hazard of being able to shift gears in the vehicle without depressing the brake pedal prior to the production of the subject vehicle.
- H. Daimler Chrysler violated its internal safety policies and procedures in the design of the automatic transmission gear selection system and the brake-shift interlock system.
- I. Daimler Chrysler was aware of the risk of vehicles being able to shift gears without depressing the brake pedal prior to the production of the subject vehicle.
- J. Daimler Chrysler, the automotive industry in general, and independent safety researchers identified the hazard of sudden, unexpected shifting into powered reverse and the hazard of being able to shift gears without depressing the brake pedal in at least the 1980s.
- K. Daimler Chrysler failed to issue proper design specifications to incorporate established, accepted, and valid dynamic testing procedures developed by independent safety organizations, the NHTSA, and the automotive industry to evaluate the transmission linkage and/or brake-shift interlock systems.
- L. Daimler Chrysler was aware of the false park position syndrome prior to the production of the subject vehicle.
- M. Daimler Chrysler violated the industrial Safety Standard of Hazard Prevention.
- N. Daimler Chrysler had the knowledge, technology and capability to eliminate the defective conditions on the subject vehicle.
- O. Daimler Chrysler failed to properly warn the users of the 2002 Dodge Durango of the hazards.
- P. Daimler Chrysler falsely represented the presence of safety features on the subject vehicle that were either not present or nonfunctional.
- Q. There were readily available, technologically and economically safer alternative designs that would have significantly reduced or eliminated the risk of harm from these defective conditions as follows:
1. Hydraulic bleed restricted to one-eighth detent motion total.

2. Provision of a positive detent device that insures park lock gear positioning.
3. Increasing the roller detent spring force.
4. A properly functioning brake-shift interlock system, including a fail safe (as opposed to fail dangerous) mechanism.
5. Incorporation of user notification (audible and luminary) of interlock failures.
6. Proper representations of the functional safety features present on the vehicle (assuming that the vehicle was not actually equipped with the brake-shift interlock, as opposed to having a failed system).

R. Applicable federal motor vehicle safety standards were inadequate to protect the public from unreasonable risks of injury or damage and Daimler Chrysler has withheld or misrepresented information and material relevant to the federal government's or agency's determination of adequacy of the pertinent safety standards or regulations. For example, the standards do not specifically require brake shift interlock systems, nor do they address false park situations, evaluations, or testing to evaluate such hazards. Despite numerous Chrysler vehicle park to reverse recalls (e.g. Jeep Grand Cherokee, Dodge Dakota), each of those recalled vehicles passed the federal standards and Chrysler has still failed to communicate the full nature of the problems and the obvious inadequacy of the applicable standards.

S. Further Discussion

The subject accident occurred when Mrs. Vettters stopped her vehicle in her home driveway to get her mail. She was found across the street in a neighbor's driveway along the path of the vehicle, with the vehicle resting beyond her body in the neighbor's yard. Incoming mail from her mailbox, her glasses and a cell phone were found in a blood pool in which she came to rest, suggesting that she was able to get to her mailbox and return to or near the vehicle prior to her getting dragged or struck by the vehicle. Her left shoe was found in the street and her right shoe was found virtually underneath the front end of the vehicle at the final point of rest.

The investigating officer's report reflects that the vehicle was parked in the driveway when it slipped into reverse. The report also states that Mrs. Vettters "attempted to get back into the vehicle," and that the driver's door was found closed. The vehicle was found in reverse gear post accident. Police photos document various markings on the vehicle. The location of the vehicle post accident is consistent with a clockwise rotation of the steering wheel as it rolled down the drive way into the street. Testing of the vehicle, without steering input, demonstrated a straight powered roll away for a significant distance down a concrete incline, across a flat concrete area, up a slight concrete incline, and into grass without significant path deviation.

The owner's manual and invoice for the subject vehicle state that it was built with a brake-shift interlock mechanism. The manual also states that the vehicle was built with an

ignition key interlock. Upon inspection of the vehicle, neither the brake-shift interlock nor ignition key interlock functioned properly. A further joint tear down inspection will be required to establish whether these safety features were actually present as represented on the vehicle or whether, although present, they failed by way of design or manufacturing defect.

If the vehicle was in full gated park and all safety systems were in place and functional, the vehicle would not shift from park to reverse unless Mrs. Vettters depressed the brake pedal and manually shifted from park to reverse. In the above scenario, it is likely that Mrs. Vettters would have been seated in the vehicle when shifting occurred and it is unlikely that she would have been dragged under the vehicle, run over, and suffer fatal injuries. Assuming that the vehicle was merely left in reverse when she exited the vehicle, the vehicle would have moved rapidly rearwards and would not have allowed Mrs. Vettters to reach her mailbox and return to the vehicle prior to its movement out of the driveway and across the street. Assuming the vehicle was left in reverse, it is unlikely it will remain stationary, and if it can be positioned to remain stationary, it is unlikely it will suddenly move as she approaches or reenters the vehicle.

Thus, the likely accident scenarios are: (1) the gear selector was positioned between park and reverse and self-shifted to reverse, which initiated the scenario; (2) the failure (or absence) of the brake shift interlock allowed the vehicle to be inadvertently shifted from park to reverse upon attempted reentry into the vehicle with mail and/or a cell phone in one of her hands; and (3) a combination of the two scenarios.

These accident scenarios were easily preventable by Chrysler. A reasonably safe system must include the use of a positive detent mechanism that prevents positioning between park and reverse (false park) and will force a shift lever either into full reverse or full detent gated park in conjunction with the use of a functional brake-shift interlock. These two design features will prevent unintended rearward movement of the vehicle due to shifts landing between park and reverse and shifts from park to reverse without depressing the brake pedal.

1. Hazard Prevention Discussion

Hazards are defined as a condition of a product that exposes the person to a risk of injury when used for its intended purpose, foreseeable purpose, and reasonably foreseeable misuse. The hazards in this specific case are the ability of the vehicle's automatic transmission gear selection system to self-shift or slip from park to reverse and the lack of a proper brake-shift interlock system. It is the fundamental purpose of safety to prevent hazards in products from injuring users. This safety philosophy generated safety principles that were codified into a published safety practice known as the Standard of Good Engineering Safety Practice. Safety organizations such as ASSE and ASME published papers on the subject of hazard prevention and the literature stated the safety standard that is referred to as the Hazard Prevention Safety Standard. The standard expresses the principles of safety that obligates a manufacturer of products as follows:

- a. To identify all hazards.
- b. To eliminate the hazards where practical.

- c. To guard or otherwise protect the user from the hazard.
- d. At a minimum to warn and instruct the user to protect themselves from the hazard.

The safety standard applies to any product including vehicles and is voluntary rather than mandated by the government. One advantage of applying this safety standard to products is it can be used as a method of comparing the internal safety policy, practices, and procedures of the manufacturer. I have reviewed the safety policy of Daimler Chrysler in designing vehicles for their customers. It is important to understand that meeting the minimum FMVSS is a mandatory requirement by the NHTSA to allow sale of vehicles in the United States.

2. Hazards that can occur with vehicle in false park

There are two hazards that can occur with a vehicle in false park:

- a. Vehicle Rollaway (unpowered).
- b. Powered Vehicle Movement Rearward.

I evaluated the subject vehicle to determine whether a false park detent exists in the gear selection system, and if the subject vehicle can be placed in false park and then suddenly, unexpectedly engage powered reverse and accelerate rearward. Placement of the shift lever in the false park position occurs while the operator is shifting from any gear toward park. This can occur due to a tolerance lag between the shift lever forward movement and the transmission rooster comb. Several tactical and sensory factors created by the gear selection design result in the parking system achieving the false park position with the engine/powertrain disconnected and the PRNDL console display indicating the letter 'P' window range, 'R' window range, or no indication light. Since the detent system is not engaged in a locked park position, the gear selector lever can either be vibrated, jarred or contacted into powered reverse. It can also hydraulically bleed fluid into the powered reverse gear.

The next step in analyzing the design of the 2002 Dodge Durango was to review the safety policy used by Daimler Chrysler to minimize the hazard of the inherent defect of false park. This included review of industry, government regulatory, and internal standards used to design the subject vehicle gear selection system.

- a. Industry Standards
 - SAE J915 Automatic Transmission - Manual Control Sequence
 - SAE J2208 Park Standard for Automatic Transmissions
- b. Federal Motor Vehicle Safety Standards, (FMVSS)
 - FMVSS 102 Transmission Shift Lever Sequence, Starter Interlock, and Transmission Braking Effect
 - FMVSS 105 Hydraulic and Electrical Brake System
- c. Daimler Chrysler Internal Standards
 - DS-107 BSR Design Guidelines
 - PF-9010 "PRNDL" Indicator Assembly
 - PF-8500 General Requirements
 - PF-9548 Gearshift Knob Assembly - Automatic Transmission
 - CP-115E Braking Effect
 - CP-269B Auto Trans Starter Interlock
 - CP-116B Shift Lever Position & Pattern Displays
 - CP-105/217 Moving Bather Park Mech Tmpact
 - CP-353 Ignition Key Combinations
 - CP-348B Similar to CP- 116
 - CP-324 Brake System Performance Test
 - PF-9187 Cable Assembly - Ignition Interlock
 - PS-6013 Geometric Dimensioning and Tolerance

From the information provided in these standards there is no design or test standards to evaluate the vehicle condition of false park and its ramifications to vehicle operation.

In addition to the design standards, Daimler Chrysler also issued design specifications for the gear selection system. The drawings reflect the specifications that apply to the components that make up the gear selection system. Based upon this information there is no specification for the hydraulic controls to limit the engagement of transmission gear positions within the specified roostercomb (manual lever) dimensions and tolerances. Without a specific tolerance for hydraulic control engagement point in the transmission gear selection the bleed points cannot be controlled by the assembly. The shift synchronization between the steering column insert plate and linear transmission manual detent has several issues:

1. The operator feels a different detent position that is longer in duration than the other detents.
2. Movement of the shift lever handle to park requires a longer motion.
3. The control for proper lock detenting into park is shifted to the upper shift handle lever detent plate in the housing.
4. The detent into park is not as crisp as the other positions because the ball plunger is not snapped into park detent.
5. The detent plunger ball can rest on the lands between park and reverse.

It is also possible due to hand motor function that when the operator hits the stop on the manual lever they will rebound with their hand and release the lever on the flat land. When this happens, if the engine is not turned off and the key removed the driver may not recognize the position. These tactical factors were found in several consumer studies conducted by contracted agents of NHTSA during the C8-02 investigation. The result is the potential for placement of the shift lever in false park is increased.

I was not provided drawings for the steering column shift handle detent plate for the subject vehicle and I understand that Daimler Chrysler has not provided numerous design and assembly drawings, details drawings and internal specifications relating to the gear shift selection system, internal transmission components, brake-shift interlock system, parking gear system, and wiring diagrams and drawings pertaining to the interlock systems. My opinions are therefore subject to review of this important information.

There is a flat land between the reverse and park notch, and the park notch appears deeper than all others with a width greater than the rectangular shaped lock tang. The insert plate has a notch opening beyond the park notch for the tang bracket to contact and serve as an internal stop. The design of this system allows the tang to rest on the flat land between park and reverse and remain there in an unstable position. This is the area where the false park position occurs on the subject vehicle along with reverse bleed. If either the operator fails to move the shift lever to

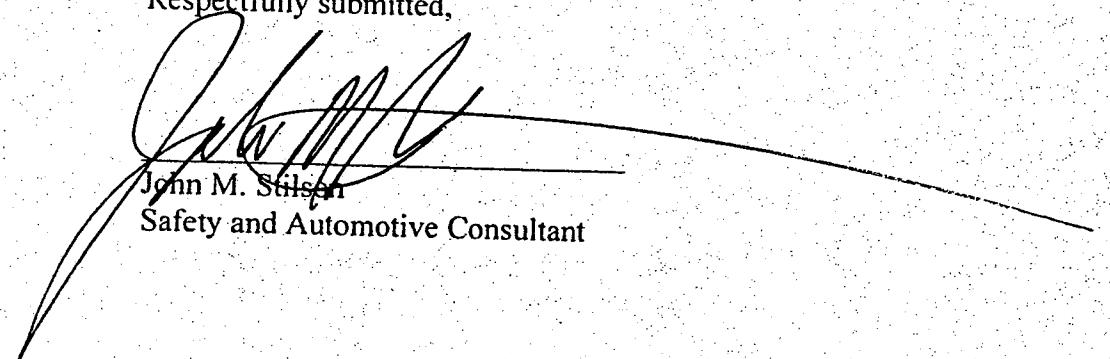
full lock park engagement or the shift lever bounces back on to the land, the potential for false park occurs.

Another area of design analysis concerns what is called a failure mode effects analysis (FMEA). This procedure encompasses an engineer considering every conceivable failure mode of a system.

The procedure is required by internal Daimler Chrysler standards for all systems involved in the vehicle design. Once the FMEA is completed the engineer can develop a design verification plan and report (DVP & R) to test for the failure modes. Based upon my experience and the DVP & R there was no consideration given for the potential for false park and testing to evaluate the consequences to the customer.

The conclusions drawn from this design analysis support my overall opinions that a defective condition existed on the subject vehicle and exposed the driver to an unreasonable risk of serious injury or death.

Respectfully submitted,



John M. Stilson
Safety and Automotive Consultant